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Report No. 12-60

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ABSTRACT Objectives: This study was conducted to investigate whether incidence rates of malignant cutaneous melanoma in U.S. Department of Defense active duty military personnel differed from rates in the U.S. general population between 2000 and 2007. Methods: The study population included active duty military personnel and the general population aged 18 to 56 years. Data were obtained from the U.S. Department of Defense medical data systems and from the Surveillance Epidemiology and End Results program. Melanoma risk was estimated by incidence rate ratios (IRRs). Results: Melanoma risk was higher among active duty personnel than the general population (IRR = 1.62, 95% confidence interval = 1.40–1.86). Incidence rates were higher for white military personnel than for white rates in general population (36.89 and 23.05 per 100,000 person-years, respectively). Rates were also increased for military men and women compared with SEER (men, 25.32 and 16.53 per 100,000; women, 30.00 and 17.55 per 100,000). Air Force service personnel had the highest rates and Army had the lowest. Conclusion: Melanoma rates were marginally higher among active duty military personnel than the general population between 2000 and 2007.

INTRODUCTION

The primary cause of melanoma is exposure to ultraviolet radiation through ambient sunlight or artificial sources.[1–3] Repeated, intense exposure to sunlight in childhood and young adulthood may increase melanoma risk later in life, especially among those with fair skin pigmentation, light eye and hair color, and propensity to freckle.[4–9]

Studies comparing melanoma risk among military personnel with the general population have reported inconsistent findings.[10–13] The purpose of this study was to investigate incidence rates of melanoma among active duty military personnel between 2000 and 2007 using comprehensive case ascertainment and compare these rates with a U.S. population-based national cancer registry.

METHODS

This study examined two populations, U.S. Department of Defense (DoD) personnel on active duty service and the U.S. general population.

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This research has been conducted in compliance with all applicable federal regulations governing the protection of human subjects in research (Protocol NHRC.2004.0034). Approved for public release; distribution is unlimited.

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doi: 10.7205/MILMED-D-13-00356

Department of Defense

The DoD study population consisted of active duty military service personnel from all service branches who served between January 1, 2000 and December 31, 2007, identified using rosters from the Defense Manpower Data Center (DMDC). For the first and last year of active duty status, a service member was included in an annual denominator if service was indicated on a monthly active duty roster for at least 6 months in a calendar year for any of the 8 calendar years from January 1, 2000 to December 31, 2007, otherwise during the intervening years, a service member was on active status the entire calendar year for all 12 months. Each person could potentially contribute up to 8 years in the denominator using person-years measurement.

Analysis was restricted between ages 18 and 56 years; the upper limit was chosen because of the low number of personnel over age 56 and that no melanoma cases were diagnosed in this age group. Age, sex, race, and service branch information were obtained from the DMDC. Race was defined as white, black, American Indian/Alaska Native, or Asian/Pacific Islander, consistent with federal guidelines for evaluating race.[14] Hispanic ethnicity was excluded because of small numbers of melanoma cases and to minimize potential residual confounding.

Cases of melanoma were included if the date of the first primary diagnosis occurred during the study period and were defined using *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM)[15] codes 172.0–172.9[15] and *International Classification of Diseases for Oncology, 3rd Edition* (ICD-O-3) codes C44.0–C44.9.[16] In situ cases were excluded.

Newly diagnosed cases were obtained from the Automated Central Tumor Registry (ACTUR) and Medical Data

Repository (MDR). ACTUR, a military cancer registry operated by the Armed Forces Institute of Pathology (AFIP) since 1986, collects information on tumor site, histology, and stage. Cases were identified using date of diagnosis and ICD-O-3 site codes (C44.0–C44.9) recorded in ACTUR during the relevant time interval. ICD-O-3 coding was based on histology findings from tissue biopsy. MDR, a DoD system-wide, comprehensive database system, contains information on inpatient and outpatient services, including military treatment facilities operated by DoD, and civilian care providers within the TRICARE network, the health care program for Uniformed Services personnel, retirees, and their families. Billing records were used to search for ICD-9-CM codes 172.0–172.9 among primary and secondary diagnosis fields.

A search algorithm was developed to aggregate the ICD-9-CM and Current Procedural Terminology (CPT) codes for each service member using the following inclusion criteria: (1a) at least one inpatient primary or at least two secondary ICD-9-CM codes with different dates of service, in conjunction with (1b) inpatient excisions or inpatient chemotherapy searched by ICD-9-CM procedure codes; (2a) at least one outpatient primary or at least two secondary ICD-9-CM codes with different dates of service, in conjunction with (2b) outpatient excisions, outpatient radiation, or outpatient chemotherapy searched by CPT codes (Fig. 1). Two sources of case ascertainment were pursued because most, if not all, TRICARE network cases found within the MDR system are not reported in ACTUR.[12] For cases identified through the MDR, the melanoma date of diagnosis was the earliest occurrence of ICD-9 codes 172.0–172.9 that had a confirmatory event. The possibility of over ascertainment of melanoma cases was addressed by requiring a confirmatory event (i.e., procedure) in the medical data indicated by CPT and ICD-9-CM inpatient procedure codes, such as excision for malignant tumors, chemotherapy, and outpatient radiation therapy, for each case. These confirmatory steps minimized over ascertainment bias arising from biopsies conducted to rule out a diagnosis of melanoma. The MDR search criteria excluded melanoma recurrence. If a case was identified from both ACTUR and MDR, ACTUR was deemed the source of record.

U.S. General Population

The National Cancer Institute's (NCI) Surveillance Epidemiology and End Results (SEER) program supports population-based cancer registries in certain U.S. states, counties, and regions. Data from 17 SEER registries (SEER-17), containing case information on 26% of the total U.S. population, were downloaded from SEER*Stat in November 2011.[17] The search term "malignant melanoma" was used to identify cases between January 1, 2000 and December 31, 2007. SEER defines malignant melanoma as ICD-O-3 codes C44.0–C44.9, which are equivalent to ICD-9-CM codes 172.0–172.9[15]; only

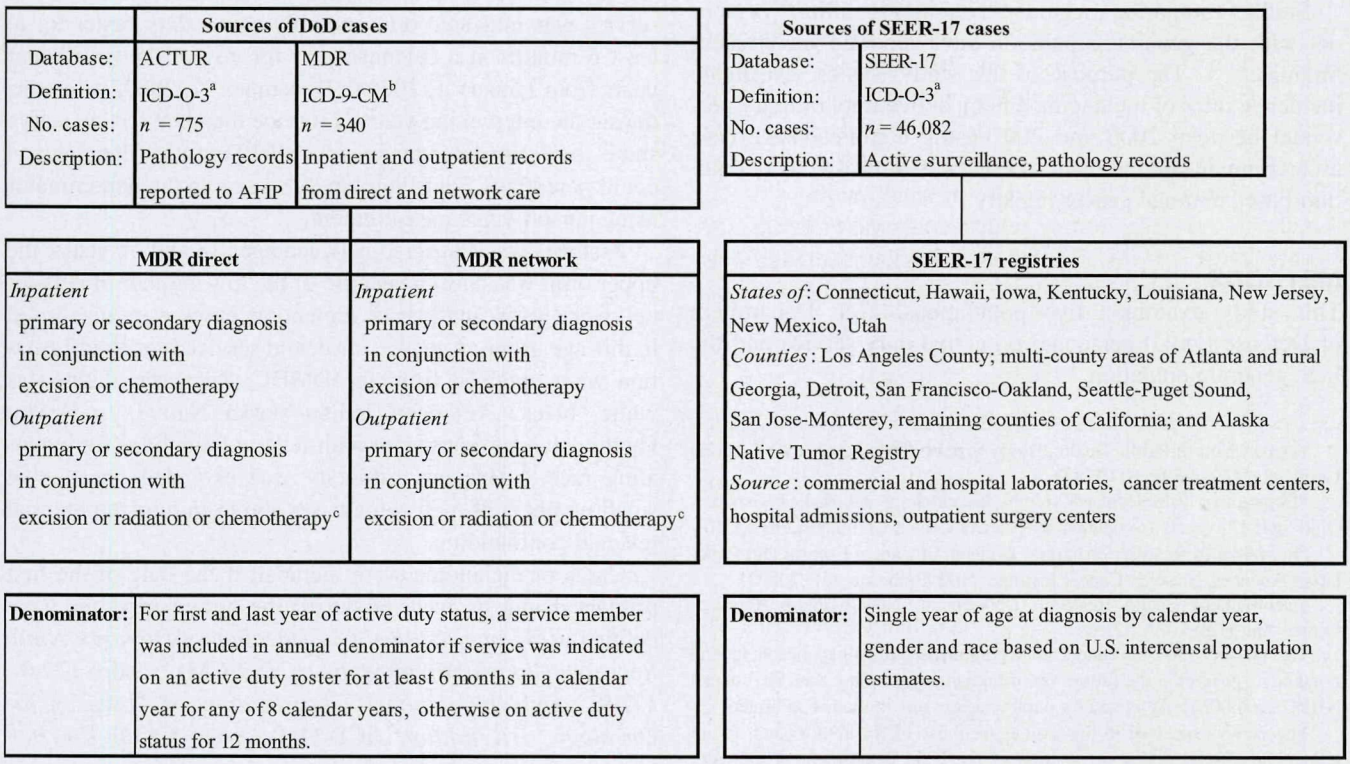

FIGURE 1. Sources of cases and population-at-risk by DoD and SEER-17. [a]International Classification of Diseases, Oncology, Third Edition (ICD-O-3); codes C44.0–C44.9, [b]International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM); codes 172.0–172.9, [c]located using Current Procedural Terminology codes.

the first primary cases were included. Fields obtained included melanoma case counts, age at diagnosis (18–56 years), sex, and race. Hispanic ethnicity was excluded for consistency as previously described. For each single year of age 18 to 56, one record was created for each combination of year (2000–2007), race (white, black, American Indian/Alaska Native, Asian/Pacific Islander, Other Specified, and Unknown), and gender. The source of the population denominator is based on intercensal estimates downloaded from the SEER website for years 2000–2007.[18]

Analysis

Unadjusted and adjusted melanoma incidence rates were computed. Unadjusted rates by service branch were computed as cases divided by person-years multiplied by 100,000 and then stratified by sex (male, female) and age group (≤29, 30+ years).

Incidence rates for DoD and SEER-17 populations were generated using direct standardization. Cases and population-at-risk denominators were previously described for DoD and SEER-17 populations, respectively (Fig. 1). The standard population was generated by summing population denominators of the DoD and SEER-17 groups.[19]

A SAS macro (Version 9.3, SAS, Cary, NC) was written to compute direct rates controlling for age (<25, 25–29, 30–34, 35–39, 40–44, ≥45 years), sex (male, female), race (white, nonwhite), and year of diagnosis (2000–2003, 2004–2007). Incidence rates for DoD and SEER-17 groups were stratified by age (≤29, 30+ years), race (white, nonwhite), and sex (male, female). Age groups ≤29 and 30+ were selected since approximately 50% of the active duty military personnel were under age 30 during the study period. Race categories were white and nonwhite (Black, American Indian/Alaska Native, and Asian/Pacific Islander) because of small numbers in the other race groups. The 95% confidence interval (95% CI) for DoD and SEER rates was computed using the method of Fay and Feuer.[20] Incidence rate ratios (IRRs) comparing the standardized incidence rates for DoD and SEER-17 populations were computed for each stratum. The 95% CIs for IRRs were computed using the method of Tiwari et al.[21] Records with other, unknown, and unspecified race (n = 10) were excluded from the analysis. This study was approved by the institutional review boards at Naval Health Research Center and East Carolina University.

RESULTS

A total of 2,093,157 active duty service members (1,788,232 men and 304,925 women) were evaluated. Service representation by branch was 37% Army, 24% Navy, 23% Air Force, 13% Marine Corps, and 3% Coast Guard. There were 1,105 cases of melanoma identified during a mean of 4.1 years follow-up time (Table I). Seventy-five percent were 30 years of age or older at diagnosis (mean age at diagnosis, 36 years; SD, 5.7 years), 83% were male, and 97% were

TABLE I. Unadjusted Melanoma Incidence Rates by Age, Sex, and Service Branch, U.S. Active Duty Military Personnel, 2000–2007

Branch	Population Size	Mean (μ) Follow-up[a]	Men Aged ≤29 Years			Men Aged 30+ Years			Women Aged ≤29 Years			Women Aged 30+ Years			Total		
	Count (%)	μ	Case[b]	PY	Rate[c]	Case	PY	Rate	Case	PY	Rate	Case	PY	Rate	Case	PY	Rate
Army	766,149 (37)	3.9	61	1,505,631	4.05	176	1,063,410	16.55	14	253,235	5.53	33	158,752	20.79	284	2,981,028	9.53
Navy	506,012 (24)	4.4	43	1,017,089	4.23	194	889,830	21.80	19	192,820	9.85	33	103,014	32.03	289	2,202,753	13.12
Air Force	486,975 (23)	4.5	50	873,728	5.72	262	925,786	28.30	41	254,561	16.11	40	154,158	25.95	393	2,208,233	17.80
Marines	281,613 (13)	3.6	35	701,782	4.99	62	250,909	24.71	3	44,940	6.68	1	12,243	8.17	101	1,009,874	10.00
Coast Guard	52,408 (3)	4.8	6	111,296	5.39	26	113,243	22.96	5	16,657	30.02	1	10,055	9.95	38	251,251	15.12
Total	2,093,157	4.1	195	4,209,526	4.63	720	3,243,178	22.20	82	762,213	10.76	108	438,222	24.65	1,105	8,653,139	12.77

[a]Mean follow-up time was computed as total person-years (PY) divided by population size. [b]Includes white and nonwhite cases. [c]Unadjusted rate was computed by dividing melanoma cases by PY and expressed per 100,000 PY.

white. Fifty-seven percent of female cases were 30 years of age or older at diagnosis.

Table I displays melanoma incidence rates stratified by age, sex, and service branch. The unadjusted melanoma incidence rate was 12.77 per 100,000 person-years (hereafter melanoma incidence rate/100,000 person-years is expressed as rate). Melanoma diagnosis varied by branch of service ($\chi^2 = 105.9$, $p < 0.001$). Air Force had the highest rate (17.80), whereas the Army had the lowest rate (9.53). By subgroup, the highest rate was in female Navy personnel aged 30+ (32.03) and lowest rate was in male Army personnel aged ≤29 (4.05). For men aged 30+, Air Force had the highest rate (28.30).

Among 266,423,765 person-years in the SEER-17 study population, 46,082 new melanoma cases were reported. Ninety percent were aged 30+ years at diagnosis, 49% were male, and 98% white. Seven percent of men and 13% of women were diagnosed at ages ≤29. Mean age at diagnosis was 44 years (SD, 9.3 years).

Table II presents incidence rates, IRRs, and 95% CIs, adjusted for age, sex, race, and year of diagnosis. The overall melanoma incidence rate for DoD personnel was 27.62 (95% CI = 23.89–32.13). For ages ≤29 and 30+, the rates were 9.36 (95% CI = 7.94–11.00) and 35.08 (95% CI = 29.88–41.42), respectively. The rates for men and women were 25.32 (95% CI = 22.81–28.06) and 30.00 (95% CI = 23.06–38.92), respectively.

The melanoma incidence rate for SEER-17 population was 17.03 (95% CI = 16.87–17.18). For ages ≤29 and 30+, the rates were 6.14 (95% CI = 5.97–6.32) and 21.47 (95% CI = 21.27–21.68). The rates for men and women were 16.53 (95% CI = 16.31–16.74) and 17.55 (95% CI = 17.33–17.77), respectively.

Comparing relative incidence rates between DoD and SEER-17 populations, the IRR, adjusted for age, race, sex, and year of diagnosis was 1.62 (95% CI = 1.40–1.86) (Table II). Most comparisons between DoD personnel and the general population showed an increased IRR. For men, the IRR was 1.53 (95% CI = 1.38–1.69), and for women the IRR was 1.71 (95% CI = 1.31–2.16). The IRR for women aged ≤29 was 1.75 (95% CI = 1.40–2.14), and for women aged 30+ the IRR was 1.70 (95% CI = 1.26–2.22).

TABLE II. Standardized Melanoma Incidence Rates and Rate Ratios by Age, Sex, and Race, DoD and SEER-17 Populations, 2000–2007

	DoD			SEER-17			Incidence Rate Ratio
Group[a]	Cases (%)	PY[b]	Adjusted Rate[c,d] (95% CI)	Cases (%)	PY	Adjusted Rate (95% CI)	(95% CI)
Total Population	1,105 (100)	8,650,944	27.62 (23.89–32.13)	46,082 (100)	266,423,765	17.03 (16.87–17.18)	1.62 (1.40–1.86)
≤29	296 (27)	4,971,739	9.36 (7.94–11.00)	4,667 (10)	74,816,702	6.14 (5.97–6.32)	1.52 (1.29–1.78)
30+	809 (73)	3,679,205	35.08 (29.88–41.42)	41,415 (90)	191,607,063	21.47 (21.27–21.68)	1.63 (1.39–1.90)
Men	915 (83)	7,450,788	25.32 (22.81–28.06)	22,499 (49)	132,604,467	16.53 (16.31–16.74)	1.53 (1.38–1.69)
≤29	206 (23)	4,209,526	4.80 (4.17–5.52)	1,605 (7)	37,858,304	4.25 (4.05–4.47)	1.13 (0.97–1.30)
30+	709 (77)	3,241,262	34.13 (30.56–38.04)	20,894 (93)	94,746,163	21.79 (21.50–22.09)	1.57 (1.40–1.74)
Women	190 (17)	1,200,156	30.00 (23.06–38.92)	23,583 (51)	133,819,298	17.55 (17.33–17.77)	1.71 (1.31–2.16)
≤29	90 (47)	762,213	14.44 (11.56–17.86)	3,062 (13)	36,958,398	8.25 (7.96–8.55)	1.75 (1.40–2.14)
30+	100 (53)	437,943	36.04 (26.56–48.43)	20,521 (87)	96,860,900	21.15 (20.86–21.44)	1.70 (1.26–2.22)
White	1,071 (97)	6,164,533	36.89 (31.88–42.99)	45,457 (98)	194,288,100	23.05 (22.84–23.26)	1.60 (1.38–1.83)
≤29	285 (27)	3,575,067	13.09 (11.07–15.43)	4,604 (10)	51,943,572	8.71 (8.46–8.97)	1.50 (1.27–1.76)
30+	786 (73)	2,589,466	46.01 (39.15–54.42)	40,853 (90)	142,344,528	28.54 (28.26–28.82)	1.61 (1.37–1.87)
Nonwhite	34 (3)	2,486,411	2.70 (0.67–7.76)	625 (2)	72,135,665	0.85 (0.79–0.92)	3.17 (0.78–7.22)
≤29	11 (32)	1,396,672	0.83 (0.30–1.88)	63 (10)	22,873,130	0.27 (0.21–0.35)	3.03 (1.08–6.23)
30+	23 (68)	1,089,739	3.61 (0.72–11.16)	562 (90)	49,262,535	1.13 (1.04–1.23)	3.18 (0.64–7.76)
Subgroups							
White Men	889 (80)	5,491,295	33.54 (30.18–37.22)	22,225 (48)	97,840,475	22.12 (21.83–22.42)	1.52 (1.36–1.68)
≤29	198 (22)	3,137,664	6.51 (5.63–7.49)	1,585 (7)	26,478,973	5.97 (5.68–6.27)	1.09 (0.94–1.26)
30+	691 (73)	2,353,631	44.40 (39.71–49.55)	20,640 (93)	71,361,502	28.62 (28.23–29.01)	1.55 (1.39–1.73)
White Women	182 (16)	673,238	40.46 (31.02–52.65)	23,232 (50)	96,447,625	24.03 (23.72–24.34)	1.68 (1.29–2.13)
≤29	87 (48)	437,403	20.62 (16.46–25.57)	3,019 (13)	25,464,599	11.85 (11.43–12.28)	1.74 (1.39–2.14)
30+	95 (52)	235,835	47.68 (35.02–64.32)	20,213 (87)	70,983,026	28.46 (28.07–28.86)	1.68 (1.23–2.19)
Nonwhite Men	26 (2)	1,959,493	2.19 (1.04–4.37)	274 (1)	34,763,992	0.77 (0.68–0.87)	2.85 (1.34–4.98)
≤29	8 (31)	1,071,862	0.75 (0.32–1.49)	20 (7)	11,379,331	0.18 (0.11–0.27)	4.28 (1.70–9.22)
30+	18 (69)	887,631	2.93 (1.24–6.25)	254 (93)	23,384,661	1.07 (0.95–1.21)	2.73 (1.15–5.05)
Nonwhite Women	8 (1)	526,918	3.20 (0.19–13.42)	351 (1)	37,371,673	0.94 (0.84–1.04)	3.42 (0.20–11.09)
≤29	3 (38)	324,810	0.90 (0.11–3.05)	43 (12)	11,493,799	0.37 (0.27–0.50)	2.42 (0.29–7.08)
30+	5 (62)	202,108	4.23 (0.16–19.19)	308 (88)	25,877,874	1.19 (1.06–1.33)	3.56 (0.14–12.45)

[a]Groups represent white and nonwhite races, non-Hispanic ethnicity, aged 18 to 56. [b]Person-years (PY) for DoD were 2,195 less than total (8,653,139) based on those who turned age 57 during 2007, which included no cases. [c]Standard population was a combination of DoD and SEER populations. Rates were expressed per 100,000 PY. [d]Adjusted for age (<25, 25–29, 30–34, 35–39, 40–44, >45 years), sex (male, female), race (white, nonwhite), and year of diagnosis (2000–2003, 2004–2007).

White men aged ≤29 had the lowest IRR (1.09; 95% CI = 0.94–1.26).

DISCUSSION

The overall melanoma incidence rate in active duty military personnel between 2000 and 2007 was 62% greater than the general population during the same time period. Compared with rates in the general population, all rates among whites were significantly higher in the military, except for white men aged ≤29. Among whites, DoD female personnel aged ≤29 had the highest IRR compared with SEER. Risk of melanoma differed by branch of military service.

Our findings are consistent with service branch-specific studies in the active duty military where SEER data were used as the comparison population. Grayson and Lyons[10] found a 50% increase in melanoma incidence in male Air Force officers compared with the SEER population. In a male Navy population, melanoma IRRs in two occupations, "aircrew survival equipmentman" and "engineman," were found to have at least a two-fold risk of melanoma compared with general population rates.[11] Melanoma was significantly higher for women in the Navy and Air Force compared with the Army.[12] Finally, a military surveillance study of crude melanoma incidence rates found that the Air Force had the highest and Marines the lowest rates, similar to the current findings.[22]

Our findings differ from two studies, one that showed a reduced incidence of melanoma among white military individuals aged <45[12] and another that showed similar incidence among Air Force males[13] when compared to SEER population. Differences may be explained by methods used in the current analysis. The ACTUR system was incomplete because of passive reporting and absence of electronic reporting. Although required by formal policies, the extent to which incident cases were reported by health care staff is unknown.[12,13] This underreporting bias may be greater for melanomas that are often diagnosed and treated by TRICARE network providers who are not required to report to ACTUR. Expanding case ascertainment by including MDR health care encounter data in this study resulted in 30% more melanoma cases than would have been present relying on ACTUR alone. Case ascertainment from the 1980s using military hospital discharge data and inpatient follow-up alone was likely to undercount cases of melanoma as well.[10,11]

Finally, SEER-9, which represents 10% of the population, was the standard population used for comparison in the other military studies.[10–13,23] SEER-17 reflects approximately 26% of the U.S. population. A larger population sample is more representative of the general population and provides improved estimates of melanoma incidence rates.

The military conducts disease surveillance in service personnel through the Armed Forces Health Surveillance Center (AFHSC).[24] Three surveillance studies of crude melanoma incidence rates have been conducted during these periods: 1998–2008, 2000–2009, and 2000–2011.[22,25,26] These studies showed melanoma incidence rates as 9, 10.0, and 10.5 per 100,000 person-years, respectively. The AFHSC surveillance inclusion criteria were more conservative than in this study. The inclusion criteria for identifying a melanoma case include (1) two or more medical encounters with a diagnosis of "malignant melanoma" in the first diagnostic position and a diagnostic procedure and (2) five or more medical encounters with a diagnosis of "malignant melanoma" in the first diagnostic position without a confirmatory diagnostic procedure. Our criteria required at least one medical encounter instead of two in the first diagnostic position, or two from the secondary diagnostic fields, and therapeutic excisions, chemotherapy, or radiation. We modified our criteria to include two or more inpatient and outpatient primary diagnosis and kept other aspects of the algorithm the same, and found the overall melanoma incidence rate was 9.43 per 100,000 person-years. The true, crude DoD melanoma incidence rate likely falls between 9.43 and 12.77, consistent with the AFHSC 2012 rate of 10.5 per 100,000 person-years.

Rates in both DoD and SEER-17 populations were higher in women than in men. These data are consistent with recent studies of young adults (aged 20–29 years) indicating that women experience melanoma at least 1.25 times the rate of men.[27,28] Previous studies have shown that age-specific incidence rates (aged 20–44 years) were higher for white women than men until ages 45–49, when male age-specific rates exceed female rates.[29] Our data suggest the female rates are higher than male rates over ages 30+, but this was not evident in the SEER-17 population.

Military service members are represented by a range of race and ethnic combinations, with a spectrum of skin melanin content. The nonwhite category included many combinations of skin type. The role of overdetection from screening or surveillance bias in nonwhites could not be explored; the small number of nonwhite cases limits interpretation. Additional research is needed to characterize the epidemiology of melanoma in nonwhites.

This study had several limitations. Timely, accurate, and complete case ascertainment may be problematic for both DoD and SEER-17 data sources. For the DoD population, some melanoma diagnoses relied on ICD-9-CM codes that were reported on records that lacked confirmation from pathology reports, hence some miscoding was possible.

SEER incidence rates are hampered by reporting delay, the time elapsed before a diagnosed cancer case is reported to SEER.[30] The standard delay time is about 22 months, which means some SEER-17 melanoma cases diagnosed in 2007 may not be reflected in the SEER-17 data set used for analysis. For melanoma, the most recent years have the largest delay in reporting. An absolute average annual underestimate of 4.1% for melanoma incidence rates between 1973 and 1998 because of reporting delay and reporting errors has been noted in the literature.[31] If this were true with current

data, the IRR comparing the DoD and SEER-17 populations would decrease, from approximately 1.62 to 1.58. We assumed that the number of cases resulting in delayed reporting were equitably distributed between 2000 and 2007 and that any underestimation of cases did not affect the overall magnitude of the IRR, and if so, only slightly. In addition to delay, melanoma incidence is known to be underreported, particularly by private practice physicians, documented to be about 30 to 40% in the San Francisco Bay Area SEER Registry (2005–2006) and which may impact national rates.[32] Beginning in 2003, SEER began implementing electronic reporting from diagnostic pathology laboratories to central cancer registries, but this was not fully implemented during the study period. SEER registry staff does not conduct active surveillance at military facilities. Information was not available to determine the extent to which active duty military cases are reported to SEER registries. If melanoma cases are reported to SEER registries, the registry is associated with the active duty service member's usual place of residence at diagnosis, not the military facility. Thus, the true difference in DoD and SEER rates may be less than indicated, although we believe this has an insignificant impact on results.

Other biases in this study may be present. It is possible that more opportunities for routine and required screening of DoD personnel compared with the general population may have resulted in more frequent detection of early melanoma. This may result in some ascertainment bias compared with the general population. SEER-17 registry may not be a suitable comparison group for this specialized military population with unique health habits and job demands, which may place the military population at greater risk for melanoma. Melanoma diagnosed through DoD civilian network providers (i.e., nonmilitary) may also be counted in the SEER-17 case counts, although this occurrence is expected to be rare.

Melanoma prevention remains an important public health issue within DoD because service members are exposed to ultraviolet radiation under many high-risk conditions. Many factors may explain higher rates in the military compared with the civilian population. Service members may be at higher risk for melanoma because of higher background risk on entering the military, job duties within the military, or deployment history.

CONCLUSIONS

In summary, melanoma skin cancer rates in the active duty military population exceeded general population rates between 2000 and 2007. Consistent with incidence rates in the general population, younger women were diagnosed more frequently with melanoma than younger men. Both active duty men and women exhibited higher melanoma incidence compared with the general population, which persisted after stratification by both age group and race (white/nonwhite). Further studies are recommended to identify the roles of early detection and exposures in melanoma risk among active duty military personnel.

ACKNOWLEDGMENTS

We thank Zhuoqiao Wang, MS, with IMS, Inc., an NCI contractor, for reviewing programming code and appreciate helpful comments from Dr. Nancy Crum-Cianflone, Chair, Deployment Health Research Department, Naval Health Research Center. This work represents report 12-60, supported by the Deployment Health Research Department, under work unit number 60002.

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REPORT DOCUMENTATION PAGE

1. REPORT DATE (DD MM YY)
Nov 2012

2. REPORT TYPE
Journal submission

3. DATES COVERED (from – to)
2000 -2007

4. TITLE
Melanoma Incidence Rates in Active Duty Military Personnel Compared With a Population-Based Registry in the United States, 2000-2007

5a. Contract Number:
5b. Grant Number:
5c. Program Element Number:
5d. Project Number:
5e. Task Number:
5f. Work Unit Number: 60002

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12-60

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10. SPONSOR/MONITOR'S ACRONYM(S)
NMRC/BUMED

11. SPONSOR/MONITOR'S REPORT NUMBER(s)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES
Military Medicine (2014), 179(3), 247-253

14. ABSTRACT
Objectives: This study was conducted to investigate whether incidence rates of malignant cutaneous melanoma in U.S. Department of Defense active duty military personnel differed from rates in the U.S. general population between 2000 and 2007.

Methods: The study population included active duty military personnel and the general population aged 18 to 56 years. Data were obtained from the U.S. Department of Defense medical data systems and from the Surveillance Epidemiology and End Results program. Melanoma risk was estimated by incidence rate ratios (IRRs).

Results: Melanoma risk was higher among active duty personnel than the general population (IRR = 1.62, 95% confidence interval = 1.40-1.86). Incidence rates were higher for white military personnel than for white rates in general population (36.89 and 23.05 per 100,000 person-years, respectively). Rates were also increased for military men and women compared with SEER (men, 25.32 and 16.53 per 100,000; women, 30.00 and 17.55 per 100,000). Air Force service personnel had the highest rates and Army had the lowest.

Conclusion: Melanoma rates were marginally higher among active duty military personnel than the general population between 2000 and 2007.

15. SUBJECT TERMS
Melanoma, military, SEER, rates, descriptive epidemiology

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	18a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Commanding Officer
UNCL	UNCL	UNCL	UNCL	9	18b. TELEPHONE NUMBER (INCLUDING AREA CODE) COMM/DSN: (619) 553-8429